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Mentor

Self-Study Course

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INTRODUCTION

This document is a user's guide consisting of nine chapters that describe various phases of road construction, inspection, and administration. The material provides basic skills and information about inspection and administration and is to be used with selected hands-on exercises. This guide shows where hands-on exercises should be used as the trainee progresses through each chapter.

Each chapter is followed by a test for you to complete immediately. The chapter test is an open book test. Your supervisor will have the answers to the tests and will review your solutions and discuss them with you.

Your supervisor plays a key role in this learning experience. Few trainees can take this exercise by themselves effectively. In order for this exercise to be effective, a total commitment between you and your supervisor must exist.

You must read each chapter carefully, including the referenced material. Answer the questions in each test, perform the hands-on exercises to the standards specified, and ask your supervisor for assistance when you need it.

Your supervisor will provide official time for you to perform and complete the exercises. He will clarify, review, and critique all tests. In addition, your supervisor should provide encouragement and support.

Figure 1 contains a schedule of the chapter material and hands-on exercises to be used that includes dates for scheduling and accomplishing the exercises. Fill in the "Date Scheduled" column when you begin the exercise. The total exercise should be planned and scheduled at the beginning. This enables your supervisor to have some control of the allocated time. In addition, it will put some pressure on you to complete the exercise within a reasonable time. The

negotiated time is dependent upon your work situations, availability of lab facilities, and your current knowledge level. The "Date Completed" column should be filled in as each part is completed satisfactorily. This gives you some measure of performance during the exercise.

SCHEDULE OF EXERCISES						
TRAINEE: _____			SUPERVISOR: _____			
Suggested Order	Chapter	Date Scheduled	Date Completed	Hands-On Exercises	Date Scheduled	Date Completed
1	1 and 2			(1) Obtain a copy of an actual public works and timber sale contract. Review all documents in the contracts. (2) Locate and review copies of the ER, COR, and Inspector's letter of designation used on your Forest. (3) Quiz.		

Figure 1.--Schedule of exercises

Figure 1. (cont.)--Schedule of exercises.

Suggested Order	Chapter	Date Scheduled	Date Completed	Hands-On Exercises	Date Scheduled	Date Completed	Comments
3	4			Attend and participate in a prework conference.			
4	5			(1) Demonstrate a complete knowledge of road construction staking, preferably by actual performance on a project. (2) Demonstrate ability to check grade from a slope stake, to determine status of exc. or embankment work. (3) Demonstrate ability to compute areas, volumes, and distances as needed to check compliance. (4) Demonstrate ability to convert slope distance to horizontal and vertical components. (5) Complete a progress payment for public works and timber sale. (6) Issue a "Work Order or Notice of Noncompliance" (6300-12) for Public Works and (7700-42) for Timber Sale. (7) Review project for Safety. (8) Quiz.			

Suggested Order	Chapter	Date Scheduled	Date Completed	Hands-On Exercises	Date Scheduled	Date Completed	Comments
5	6			Review a set of as-built drawings and final construction report from a completed Forest project.			
6	7			(1) Review the Contracts Disputes Act of 1978 (PL 95-563). (2) Review a decision by a Contracting Officer on a claim. Ensure that all the requirements were met according to PL 95-563. (3) Quiz.			

Figure 1. (cont.)--Schedule of exercises.

CHAPTER 1 BASIC INFORMATION

REFERENCES

- (1) Forest Service 1979 Standard Specifications, with Supplements.
- (2) FS 6300-42, USDA - Forest Service - General Provisions - Public Works Contract, with Supplements.
- (3) SF 23-A, General Provisions (Construction Contract).
- (4) FSM 2450, Sale Contract and Permits.
- (5) FSH 6309.11, Contract Administration Handbook.
- (6) FSH 7709.11, Transportation Engineering Handbook, Chapter 30.
- (7) FSM 7720, Transportation System - Development.
- (8) FSH 6709.31, Occupational Safety and Health Administration (OSHA) and Mining Safety and Health Administration (MSHA).
- (9) FSH 7109.17, Engineering Certification Handbook.
- (10) FSH 6709.11, Health and Safety Code Handbook.
- (11) FSM 7115, Certification of Engineering Personnel.

WHAT IS a CONTRACT?

A contract is a legal, binding agreement between two or more parties. Nearly every personal business activity involves a contract--for example, subscribing to a magazine, purchasing a television set on credit, or renting a house. Likewise, in each transaction relating to services or to the acquisition of raw materials, their manufacture, and the distribution of the finished products by businesses, a contract defines the relationship and the rights and obligations of the parties.

An essential part of our free enterprise system is protecting the rights created by contracts. Government cannot impair the obligations of a contract. Indeed, life would be more uncertain and planning would be more difficult if we did not have the assurance that agreements would be binding.

Knowledge & Skills Required

The following is a list of skills and areas of knowledge required of the Contracting Officer's Representative/Engineering Representative (COR/ER) to administer construction contracts:

- (1) Contracting and organizational lines of authority.
- (2) Technical and administrative definitions.
- (3) Algebra, geometry, and trigonometry.
- (4) Standard inspection practices and procedures.
- (5) Safety practices of the construction industry and OSHA and MSHA regulations.
- (6) Construction staking methods.
- (7) Materials and workmanship inspection.
- (8) Use of testing equipment and instruments.
- (9) Use of surveying instruments to establish control and check performance.
- (10) Communicating effectively with the Contractor, general public, and other agency representatives.
- (11) Computing construction costs and negotiating changes in the contract.
- (12) Construction practices and techniques.
- (13) Contracting regulations and requirements.
- (14) Forest Service standards and requirements.
- (15) Interpreting plans and specifications.
- (16) Oral and written communications.
- (17) Report writing.
- (18) Organizing and planning.

(19) Decisionmaking.

(20) Interpreting Environmental Analysis Reports.

Procurement Contracts

The Forest Service ordinarily uses three types of procurement contracts--supply, service, and construction. For instance, crushed rock can be procured by any one of the three types of contracts, as shown in the following comparison.

Supply Contract. Title to the crushed rock passes from the Contractor to the Government. The Government is procuring crushed rock from a source not owned by the Government. A specified quantity of rock is being deposited by the Contractor at a designated stockpile location. No actual construction work is involved.

Service Contract. In this case, the Government already owns the rock. The Contractor is providing a service by crushing and stockpiling the rock to Government specifications. No actual construction work is involved.

Construction Contract. Construction of public works or real property improvement is a major or substantial part of the total contract effort. The work results in real property improvement such as substantial roadway construction or reconstruction.

Timber Sale Contracts

Another major area of contracting involves the sale of National Forest timber. Each Forest Supervisor and Regional Forester is delegated authority through the Code of Federal Regulations (CFR) to sell timber. The authorization to construct, to reconstruct, and to maintain Forest development roads needed to harvest the timber is included with the authority to sell timber. The company that is awarded this type of contract is called a Purchaser.

Timber sale contracts include the same road construction specifications and drawings as public works contracts. Some general provisions and lines of authority of timber sale contracts differ from public works contracts. However, from the standpoint of the COR/ER and Construction Inspector's responsibilities, both types of contract are similar.

Construction Contracting Process

The following describes the sequence of events leading to the award of a construction contract:

Program Development and Budgeting. As part of the Program Development and Budgeting System, the Forest Supervisor submits to the Regional Forester a list of capital investment projects organized by priority. The Regional Forester then develops a Regional Program and submits it to the Chief for allocation considerations. The Chief then submits national programs to Congress. Project selections are based on the funding level provided by Congress.

Procurement. The line officer generally determines which public work contracts are needed. The procurement is implemented primarily by the Forest contract personnel in close coordination with line officers and staff.

The Government uses two principal methods to procure construction contracts--formal advertising and negotiation. Under Federal Procurement Regulations, construction contracts exceeding \$10,000 require formal advertising except under certain conditions.

The contracting process for timber sales is more directly related to resource management. As part of a 10-year timber management plan, timber sales are offered to prospective bidders on a closely regulated basis.

Purchasers may construct the roads using their own employees, or they may subcontract the road construction to other contractors. Moreover, since enactment of the National Forest Management Act of 1976, some purchasers may elect to have the Forest Service construct the needed roads. In this case, the Forest Service advertises, awards, and administers the contract.

The Forest Service could construct the roads with Government equipment and manpower if the cost were less than \$15,000 per mile. However, construction using Forest Service personnel and equipment is not the present policy.

A prework conference is held with the purchaser and his or her subcontractor much the same as in public works contracts.

Timber Sale Contracting Process

CONTRACT AUTHORITIES for PUBLIC WORKS

Contracting Officer's Representative

Only the Contracting Officer and his designated representatives are authorized to conduct official business with the Contractor in the administration of a contract. The line of authority for public works contracts is shown in figure 1-1.

Contracting Officers cannot delegate to another the contracting authority delegated to them. They can, however, designate a Contracting Officer's Representative (COR) to deal with the Contractor at the work site. Since the Contracting Officer is legally responsible for all actions taken with respect to the contract, the COR is responsible to the Contracting Officer for administering the contract within the authorities and limitations prescribed in the letter of designation. Under these circumstances, a direct line of communication will be established between the COR and the Contracting Officer so that questions involving contract administration may be handled without delay or misunderstanding. All written communications will be addressed directly to the COR and should be signed by the Contracting Officer over the title "Contracting Officer." The COR will provide the Contracting Officer with copies of all correspondence initiated related to the contract.

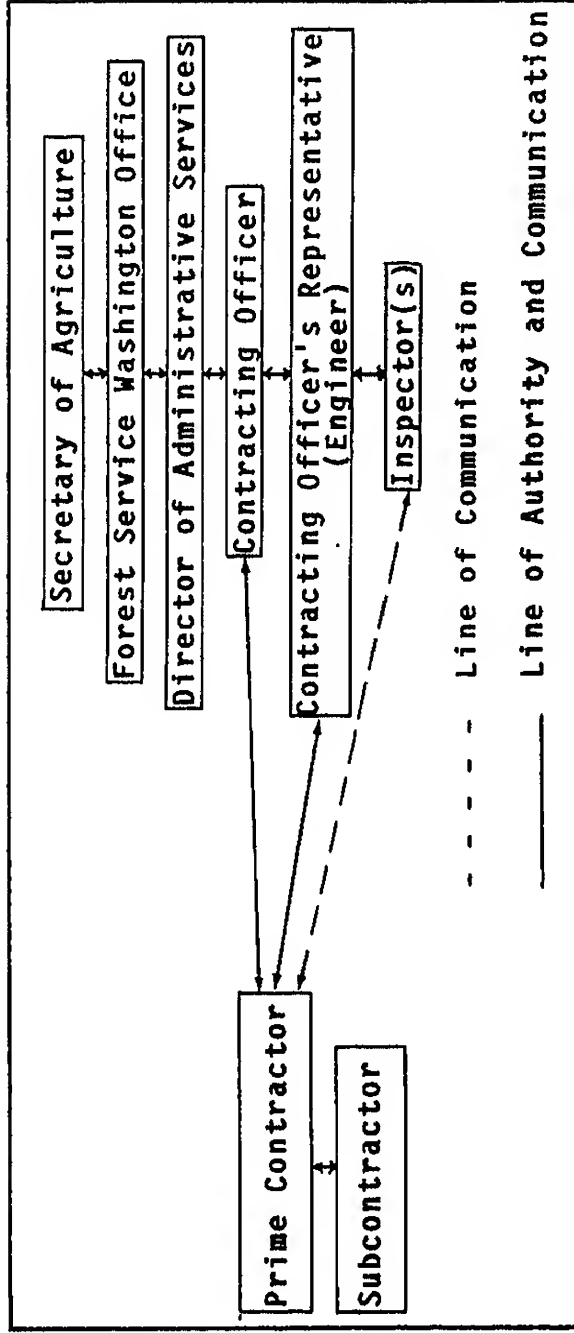


Figure 1-1.--Line of authority for public works contracts.

The Contracting Officer's Form 6300-6, Designation of COR, reserves the Contracting Officer's right to render final decisions on questions in dispute, as well as the right to make contract modifications involving adjustments in contract price or time. A copy of this designation is furnished to the Contractor.

In the event the COR will be absent, the designated Inspectors must be notified in advance of the COR's planned absence and be told where the COR can be reached. If the COR cannot be reached, the Construction Inspectors should be told to contact the Contracting Officer on such matters that would normally be referred to the COR decision. If the COR's scheduled absence will exceed 1 week, the Contracting Officer shall be notified and will designate an acting COR during the regular COR's absence.

Duties & Responsibilities of the COR. The responsibilities of the COR are--

- (1) To become thoroughly familiar with the terms, conditions, and authorities of the contract, specifically FSH 7109.17, 6309.1. SF 23-A, and 6300-42.
- (2) To ensure that labor information and equal opportunity employment posters are displayed and maintained in a prominent place at the work site during the term of the contract.
- (3) To issue orders to suspend or resume work (6309.11, Chapter 30)
- (4) To decide questions of fact arising in regard to quality and acceptability of materials furnished and work performed, acceptability of equipment to be used, manner of performance; rate of progress of the work, interpretation of plans and specifications, acceptable fulfillment of the technical phase of the contract on the part of the Contractor, and disputes and mutual rights between Contractors working on projects in the same area. The COR must consider all facts before arriving at decisions on these matters, and if agreement cannot be reached the problem should be referred to the Contracting Officer.
- (5) To issue written orders for minor changes in plans and specifications as authorized by the contract that do not affect the contract time or price.

- (6) To submit recommendations to the Contracting Officer about changes that require contract amendments and modifications that involve adjustments in the contract price or time.
- (7) To take action whenever differing site conditions, as outlined in SF 23-A, exist by--
- (a) Notifying the Contractor immediately of his rights and responsibility.
 - (b) Assembling the facts and contacting the Contracting Officer for assistance.
- (8) To obtain from the Contractor all submittals required by the contract, such as shop drawings, samples, brochures, descriptive literature, and the manufacturer's application or installation recommendations. Approve "brand name or equal" items and submittals that do not require Regional Office design approval. When design approval is required by the Regional Engineer, submit the design through the Contracting Officer to the Regional Office.
- (9) To reject any defective materials furnished by the Contractor and to disapprove any work improperly performed, subject to the Contracting Officer's final decision, by issuing written stop work orders or Notices of Noncompliance.
- (10) To report to the Contracting Officer any violations of the contract, unsatisfactory development, relationships, etc., as they occur.
- (11) To ensure that the Contractor is complying with the labor standards provisions of the contract. This includes checking payrolls (see FSH 6309.11, Chapter 20--applicable to public works construction contracts only).
- (12) To ensure that the Contractor is in compliance with brush disposal, fire protection, and sanitation measures. The Contractor must use his force on forest fires in accordance with contract provisions.
- (13) To maintain the official contract diary.

- (14) To keep precise quantity records, initiate estimates for progress payments, and maintain a record of payments made.
- (15) To maintain a contract file of all documents. Prepare all orders and correspondence affecting contract administration in writing, with copies forwarded to the Contracting Officer. And to furnish the Contracting Officer with reports of tests required and copies of compliance certifications.
- (16) To sign all contract documents and correspondence in the space above the title "Contracting Officer's Representative."
- (17) To organize and supervise the work of Inspectors assigned to the job.
- (18) To establish a relationship with the Contractor and the Contractor's authorized representatives that promotes a smooth and orderly prosecution of the work.
- (19) To conduct special investigations at the Contracting Officer's request and to prepare statements of findings on disputes, defaults, or other matters that may arise about technical aspects of the contract.
- (20) To keep abreast of the Contractor's work accomplishment as compared with contract time expended. And to discuss with the Contractor any phase of the job that may be lagging and need attention to ensure contract completion on schedule.
- (21) To provide an estimate of the amount of overrun--if it becomes apparent that there will be a cost overrun from estimated quantities--that must be reported to the Forest Budget Officer through the appropriate Forest Staff Officer so that the Budget Officer can initiate action to request the additional funds.

Construction Inspector. The Construction Inspector has the authority and responsibility for inspecting for compliance with plans and specifications. The Inspector is not authorized to make changes or to issue orders to stop or resume work. All Construction Inspectors work under the direct supervision of the COR. The primary functions of an Inspector are:

- (1) To check the Contractor's performance for compliance with the technical specifications, drawings, work schedules, and labor standards of the contract.
- (2) To advise the Contractor promptly about any deviations from the contract by issuing Form FS 6300-12, Work Order and Notice of Noncompliance.
- (3) To report promptly to the COR any refusal or failure by the Contractor to comply with such contract provisions.
- (4) To keep progress reports and an official daily diary about all actions, happenings, and other developments that may be useful later in the event of a dispute or investigation.

All dealings with the Contractor about enforcing the terms and conditions of the contract, including technical specifications and any changes, are the specific responsibility of the COR or the Contracting Officer. The Inspector shall not act as foreman, perform any duties for the Contractor, or interfere with the management of the work by the Contractor. The Inspector shall be designated in writing by the COR.

CONTRACT AUTHORITIES for TIMBER SALES

Contract administration authority is assigned to individuals by the Forest officer authorized to permit timber use (FSM 2400).

All contract authority comes from the Contracting Officer through delegations to others. The Forest Service contract organization team may consist of some or all of the following: Contracting Officer (CO), Forest Service Representative (FSR), Sale Administrator (SA), Engineering Representative (ER), Harvest Inspector (HI), Construction Inspector (CI), and Assigned Engineer (AE).

Contracting Officer. The Contracting Officer is the forest officer designated to enter into and administer contracts and to make related determinations and findings. That official is responsible for actions of the Forest Service under the contract and for inspection of the purchaser's operations to secure contract compliance.

Forest Service Representative. The District Ranger is the FSR unless another individual has been specifically designated in writing. The FSR has the responsibility to give and receive notices regarding contract performance, to take action, and to be readily available to the sale area. This person heads the District team, which administers the contract, and has the additional responsibility for describing the authority and limitations of the Sale Administrator and advising the Purchaser in writing of this action. The FSR also has authority to accept work and to delegate such acceptance in writing.

Sale Administrator. The SA is normally a part of the District organization, which administers the contract and is responsible to the FSR for administration of all harvesting activities. This normally includes checking and documenting fire requirements and precautions; approving the location of landings, temporary roads, skid trails, and other facets of logging engineering; inspecting falling, bucking, limbing, lopping, utilization, skidding, slash disposal, erosion control, and road maintenance requirements; ensuring that improvements are protected; and informing the Forest Service Representative of performance by the Purchaser.

Depending upon the work load, the SA may be assigned one or more assistants. These assistants shall perform specific work as determined by the sale administration team. Supervision and work assignments given to assistants should be structured to train them for eventual certification as sale administrators.

Engineering Representative. The ER is appointed by the CO and is responsible for obtaining contract compliance in engineering matters. The ER is responsible to the CO. The ER is normally delegated authority to make the needed adjustments to obtain compliance with the drawings and specifications. The ER also makes routine inspections to check Purchaser compliance with other road construction, maintenance, and use requirements of the timber sale contract. A contract Daily Diary, Form 6300-20a, and other recordkeeping documents must be maintained by the ER.

The most important functions of the ER are inspecting and controlling the contracted work as it progresses and making recommendations for final acceptance of the completed project. This involves a dual responsibility for seeing that (1) technical requirements are fully

complied with, and (2) the work performed by the Contractor is carried out in accordance with the contract requirements. The Contracting Officer must rely upon the judgment of the ER in inspecting and accepting workmanship and materials during progress of the work, preparing partial payments, and making decisions or recommendations incident to the day-to-day administration of a contracted project.

Construction Inspector. The CI is an assistant to the ER and is responsible for the regular inspection of road construction. Specific responsibilities normally include checks for Purchaser compliance with drawings, specifications, fire requirements, erosion control, and protection of improvements required during road construction or reconstruction on the sale.

Assigned Engineer. The AE shall be a competent construction engineer who is specifically designated by the Forest Supervisor to participate in the final inspection for specified road construction.

Figure 1-2 shows the line of authority for timber sale contracts.

Refer to--

DEFINITIONS

Sections 101 and 102 of the 1979 Forest Service Standard Specifications for Construction of Roads and Bridges.

Section 10 of FS 6300-42, USDA - Forest Service - General Provisioner Public Works Contract.

Section 1 of SF 23-A, General Provisions (Construction Contract).

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DEFINITIONS

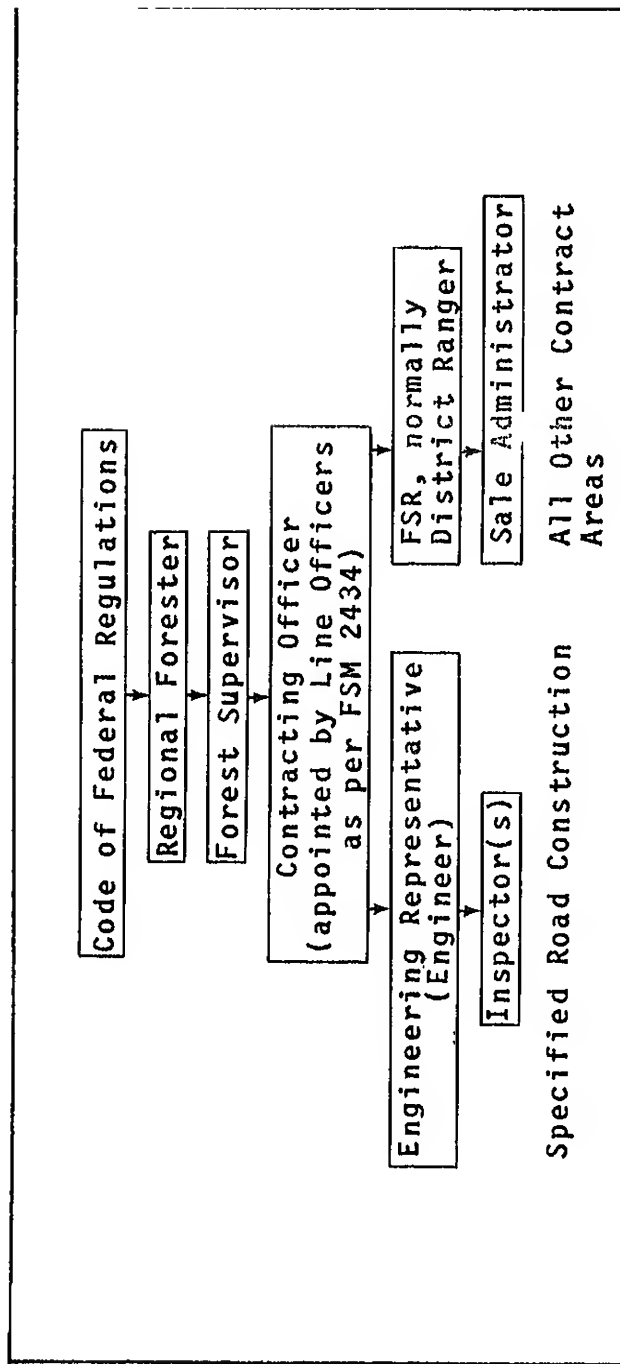


Figure 1-2.--Line of authority for timber sale contracts.

QUIZ

- 1-1 Name the three types of procurement contracts.
- 1-2 Where does the Inspector get authority regarding procurement and timber sales?
- 1-3 You are the Inspector on a public works or timber sale contract. The COR/ER has to be gone for 3 days and COR/ER assigns you as the acting COR/ER. What are your authorities?
- 1-4 Who is responsible for administering a public works contract?
- 1-5 You are assigned as an Inspector on a construction contract. What is the difference between the role of the Inspector and the COR/ER?
- 1-6 Who supervises the Inspector on:
- (a) A public works contract?
 - (b) A timber sale contract?
- 1-7 What is the contract line of authority on your National Forest for timber sale contracts?
- 1-8 A Contractor has been making reasonable progress on the construction of an Opted road. Shortly before the road completion date is reached, the Contractor requests a 60-day time extension.
- (a) Can this be done?
 - (b) Who has the authority to approve the change?
- 1-9 Which paragraph in FSH 7709.11 discusses the responsibilities and duties of the Engineering Representative, the District Ranger, and the Inspector?

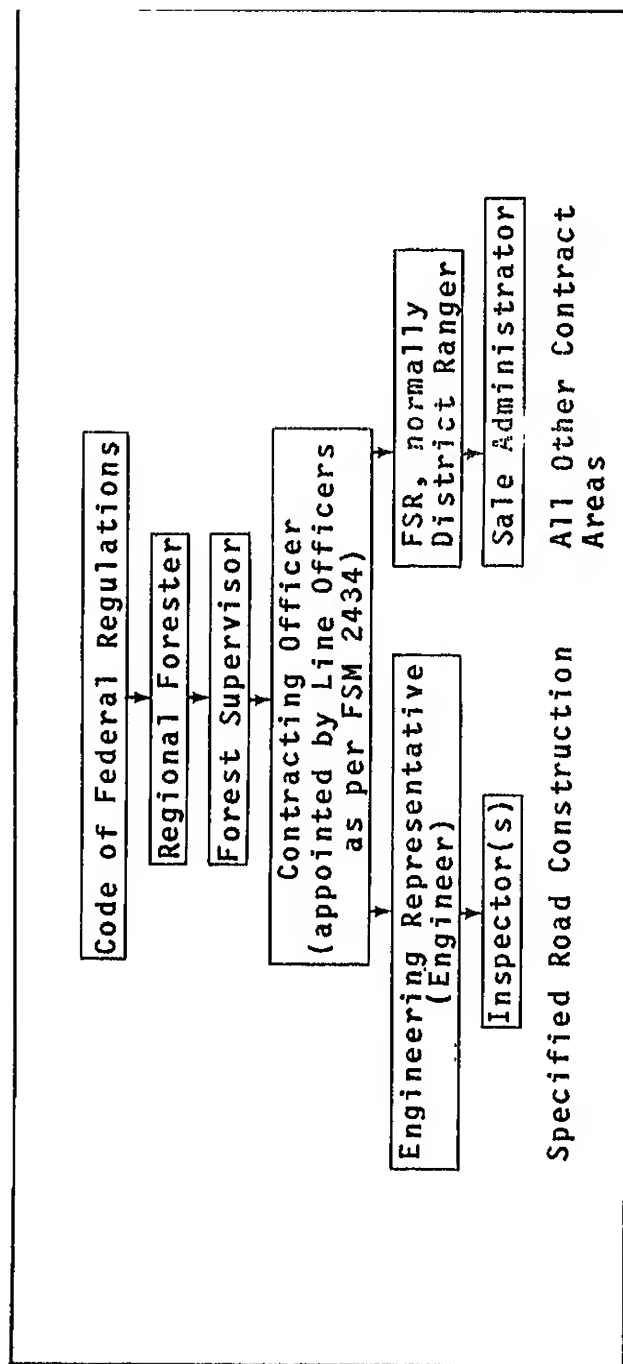


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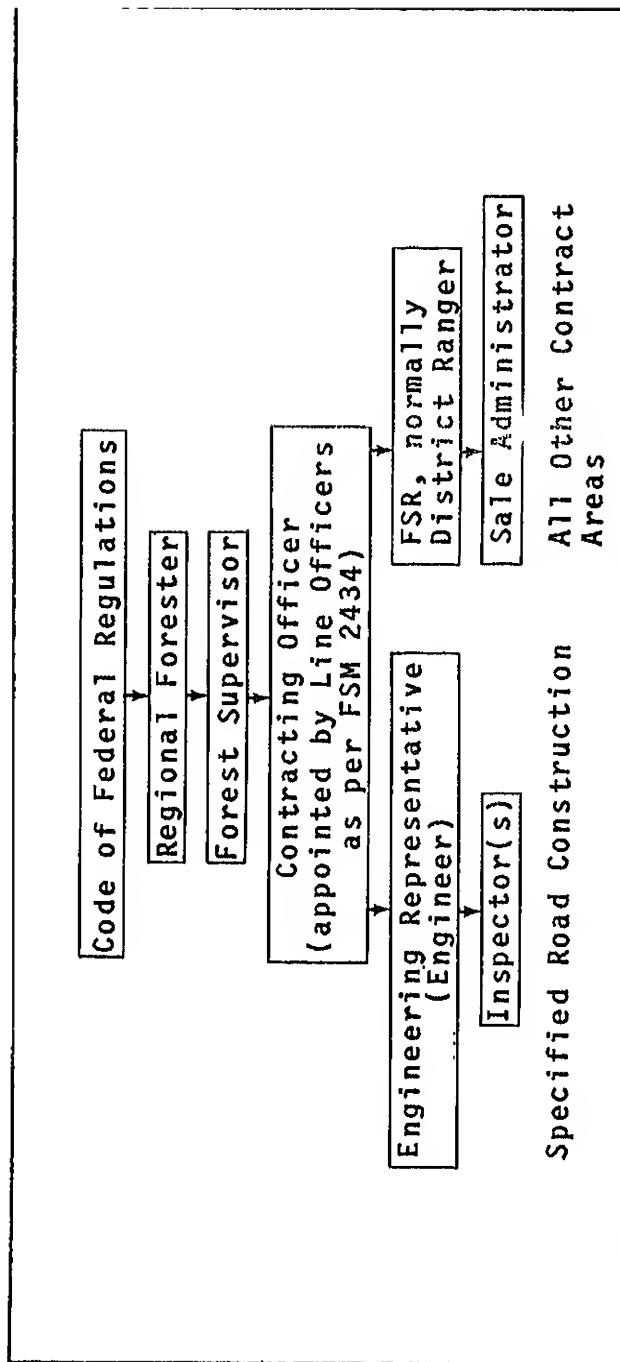


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 - (b) Who has the authority to approve the change?
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1-10 What do the following abbreviations represent?

- (a) WWPA
- (b) ACI
- (c) FPR
- (d) OSHA
- (e) MSHA
- (f) ASTM
- (g) AASHTO

1-11 Define the following terms:

- (a) Engineer
- (b) Subgrade
- (c) Roadway
- (d) Surface Course
- (e) Unsuitable Excavation
- (f) Base Course
- (g) Contractor
- (h) Traveled Way
- (i) Pioneer Road
- (j) Schedule of Items
- (k) Shoulder

1-12 Match the following terms with the numbers shown in figure 1-3.

- (a) Subgrade
- (b) Roadbed
- (c) Clearing Limit
- (d) Backslope
- (e) Traveled Way
- (f) Fill Slope
- (g) Roadway

1-13 Two of the Contractor's people work on Labor Day (Monday), which is listed as a holiday in the applicable wage rates, and the Contractor gives them the following Friday off but does not pay any overtime for the time worked on Monday. Is this correct?

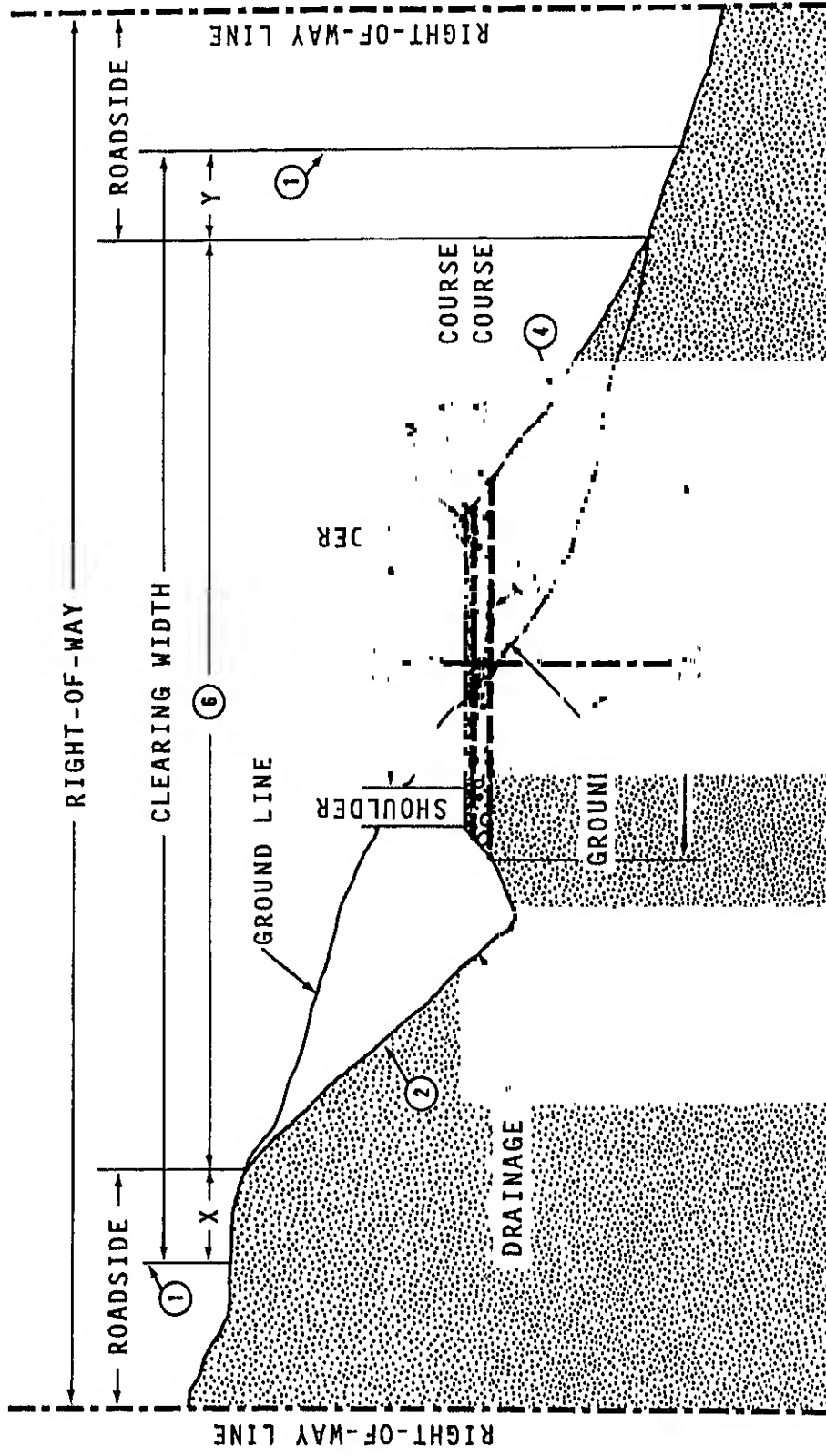


Figure 1-3.--Illustration of road construction terms.

CHAPTER 2 ROAD CONSTRUCTION CONTRACT

REFERENCES

- (1) FSM 2451, Timber Sale Contract, Form 2400-6 (1973 Edition).
- (2) FSM 2452, Timber Sale Contract, Form 2400-6T.
- (3) 2400-6, Division A, Specific Conditions (Timber Sale Contract).
- (4) 2400-6, Division B, Standard Provisions (Timber Sale Contract).
- (5) Division C, Special Provisions (Timber Sale Contract).
- (6) Forest Service Standard Specifications and Special Project Specifications for Construction of Roads and Bridges.
- (7) SF 23-A, General Provisions (Construction Contract), with Supplements.
- (8) SF 19-A, Labor Standard Provisions (Construction Contract), with Supplements.
- (9) FS 6300-42, USDA - Forest Service - General Provisions - Public Works Contract, with Supplements
- (10) AASHTO Specifications.

INTRODUCTION

The Forest Service Construction Inspector and COR/ER should be familiar with timber sale and public works contracts. This chapter outlines the important documents in each type of contract and briefly explains the purposes of each. Read carefully FSM 2451 and 2452.

TIMBER SALE DOCUMENTS

Division A (Specific Conditions). This contains the conditions in a timber sale such as location of sale area, volume of timber, payment rates, rate redetermination schedule, specified road location, design criteria, survey methods, and estimated costs. (Refer to FSM 2451 and 2400-6.)

Division B (Standard Provisions). This contains the standard provisions for timber sales. (Refer to FSM 2451 and 2400-6.)

Division C (Special Provisions). Division C is the part of the timber sale contract (C Clauses) that contains the special provisions needed to tailor the contract to meet the management objectives of individual sale areas. Quality in contract provisions is essential to a quality job of timber harvesting. (Refer to FSM 2451 and the C Clauses.)

Standard and Special Project Specifications. The Standard Specifications are actually the "Forest Service Standard Specifications for Construction of Roads and Bridges" (1979), which are used nationally for Forest Service road and bridge contracts. The Special Project Specifications are developed by each Region to modify the Standard Specifications to meet special Regional conditions. Special Project Specifications take precedence over Standard Specifications.

Drawings. Each contract normally contains drawings showing dimensions, locations, or details of important work features. Drawings are graphical descriptions of the work the Contractor is required to perform.

Note that drawings are made a part of the contract by reference. In addition, Clause B5.2 (Specified Roads) states that construction "shall be in full accordance with drawings and specifications set forth herein or attached hereto."

Clause C5.211 establishes the order of precedence for timber sale contract documents in case of discrepancies.

Schedule of Items. Each contract contains a Schedule of Items, which shows a listing and description of each construction item, quantities, units of measure, method of measurement, unit price, and total dollar amounts.

CONSTRUCTION CONTRACT DOCUMENTS

SF 19-A (Labor Standard Provisions). Standard Form 19-A contains Labor Standard Provisions applicable to construction contracts. Read carefully Chapter 20 of the Contract Administration Handbook, FSH 6309.11, and review a copy of SF 19-A, including its supplements.

SF 23-A (General Provisions). Standard Form 23-A contains General Provisions prescribed by the General Services Administration (GSA) for construction contracts. Be sure to review a copy of SF 23-A and supplements. In particular, read Section 9 (Materials and Workmanship) and Section 10 (Inspection and Acceptance), which relate most directly to the Inspector's responsibility.

FS 6300-42, USDA - Forest Service - General Provisions - Public Works Contract, and Supplements. FS 6300-42 contains Forest Service general provisions for public works contracts. These are very important clauses. Notice that Section 30.2 contains an order of precedence of contract documents for construction contracts. The following were explained in Chapter 2 for timber sale contracts: Standard and Special Project Specifications; drawings; and Schedule of Items.

QUIZ

- 2-1 What are the three major divisions of the timber sale contract 2400-6?
- 2-2 Which clauses in Division A of a timber sale contract specify:
- (a) Dates of normal operating season?
 - (b) Specified road sections?
 - (c) Inapplicable Division B clauses?
 - (d) List of Division C clauses applicable to this contract?
- 2-3 Which timber sale Division C clause shows the date by which road construction must be completed?
- 2-4 Which subsection of FSM 2451 discusses Division B clause B5.12?
- 2-5 Which Division B clause deals with construction staking?
- 2-6 Which Division B clause describes requirements for use of a partially constructed road?
- 2-7 Which Division B clause describes requirements for representatives?
- 2-8 Which Division B clause describes requirements for stream course protection?
- 2-9 Which Division C clause requires the Purchaser to furnish the Forest Service with a written general plan of operation?
- 2-10 Which Division C clauses contain requirements for specific fire precautionary measures, fire guards, and emergency fire precautions?
- 2-11 Which document in a public works contract contains fire plan requirements?

- 2-12 What is the order of precedence of the following timber sale contract documents?
- (a) Standard Specifications
 - (b) Sale Area Map
 - (c) Special Project Specifications
 - (d) Drawings
 - (e) Shop Drawings
 - (f) Special Provisions (C Clauses)
 - (g) Specific Provisions (A Clause) and Standard Provisions (B Clause)
- 2-13 Explain the difference between the design change provisions of the timber sale contract and the changes clause of the public works contract. List the required documentation for each contract.
- 2-14 Which Division C clause describes variation in quantities?
- 2-15 Which documents in a public works contract contain the Forest Service general provisions?
- 2-16 Which public works contract document contains requirements of the Davis-Bacon Act?
- 2-17 Which public works contract document contains requirements for differing site conditions?
- 2-18 Which clause in SF 23-A describes requirements for inspection and acceptance?
- 2-19 Which clause in FS 6300-42 describes requirements for subcontracting?
- 2-20 Which clause in FS 6300-42 describes variation in quantities?

- 2-21 Which clause in FS 6300-42 describes requirements for barricades, warning signs, and other devices?
- 2-22 Which standard specification describes requirements for weighing devices?
- 2-23 Which standard specification describes requirements for sampling of aggregate?
- 2-24 Which standard specification describes methods of measurement?
- 2-25 Which standard specification describes requirements for maintenance of traffic?
- 2-26 Which AASHTO specifications describe requirements for determining in-place moisture content and density of soil and aggregate?
- 2-27 Which AASHTO specifications describe requirements for:
- (a) Determining unit weight of aggregate?
 - (b) Methods of sampling crushed aggregate from stockpiles?
 - (c) Sieve analysis of fine and coarse aggregate?
 - (d) Determining amount of material finer than 0.075mm sieve in aggregate?
 - (e) Determining the liquid limit of soils?
 - (f) Determining the plastic limit and plasticity index of soils?
 - (g) Requirements for helical pipe?

- 2-28 Which standard specification subsection describes requirements for:
- (a) Disposal of merchantable right-of-way timber?
 - (b) Compaction of aggregate base or surface course?
 - (c) Backfilling metal pipe (culvert)?
 - (d) Gradation requirements for crushed aggregate for base or surface courses?
 - (e) Controlled compaction of embankments?
 - (f) Construction tolerances for roadways?
 - (g) Slash treatment methods?
- 2-29 Which standard specification describes construction staking requirements of the Contractor?
- 2-30 Which standard specification describes requirements for compaction equipment, density control strips, and nuclear testing devices?
- 2-31 During excavation for bridge footings, Indian grinding stones are discovered. What should the Inspector do?

CHAPTER 3

PREPARING for the PROJECT

REFERENCES

- (1) Copy of the Contract.
- (2) Copy of the Environmental Assessment Report (EAR).
- (3) Forest Service Standard Specifications for Construction of Roads and Bridges.

INTRODUCTION

This chapter describes actions the Inspector and the COR/ER should take after the contract is advertised and before it is awarded.

REVIEW CONTRACT

The COR/ER should obtain and study a copy of the Environmental Assessment Report; design data such as seismic, subsurface reports and the contract in order to--

- (1) Become familiar with the overall project requirements.
- (2) Identify critical locations or unusual work that may require special inspection skills or efforts.
- (3) Determine what Government-furnished materials or services are specified in the contract.
- (4) Determine what equipment and supplies are needed for inspection.

VISIT PROJECT SITE

The COR/ER and Inspector must review the project in the field before the contract is awarded in order to--

- (1) Become familiar with the exact locations of all the contract work.
- (2) Ensure that access routes to the project are available and adequate.
- (3) Ensure that construction staking and other controls are accurate and complete.

- (4) Review areas where environmental damage can occur.
- (5) Review methods of measurement, inspection techniques, special equipment, and skills needed.

SETTING UP the PROJECT FILE

All required references necessary for the job must be obtained and placed in the project file for ready use.

The Inspector should set up a separate inspection file for each project before the contract is awarded. Most experienced Inspectors use a looseleaf binder or a heavy folder that has six to eight separate sections for small projects. Each section should be designated for certain documents. There is no standard method for setting up such a file. At a minimum, the file should contain the following:

- (1) A complete set of the contract documents.
- (2) A section for correspondence such as daily diaries.
- (3) A copy of the designation letters.
- (4) A section for documents such as change orders, work orders, and notices of noncompliance.
- (5) A section for quantity records.
- (6) A section for materials test results and certificates of compliance from suppliers or manufacturers.

It is important to set up a good system to keep your contract documents and records organized and to keep the file current by filing documents promptly.

In addition to setting up the files, you should make sure that there is an adequate supply of contract administration forms. A list of the forms commonly used by the Inspectors and Engineers are in FSH 7709.11, Chapter 30, and FSH 6309.11, Chapter 70.

PLANNING INSPECTION & ADMINISTRATION

The Inspector should assist the COR/ER in determining personnel, supplies, and equipment needed during the construction phase. The following is a representative list of items that should be obtained before work begins:

- (1) Office space and equipment.
- (2) Vehicles properly equipped for the season and location.
- (3) Lab trailer.
- (4) Sampling and testing equipment.
- (5) Staking crew and Inspectors.
- (6) Overtime authorizations.
- (7) Safety equipment and training.
- (8) Crew's quarters.
- (9) Radios.

Many projects may be in progress simultaneously. At this point, it is important to discuss the administration of the projects. A staffing plan can help ensure that the most important items are inspected before conflicts develop.

QUIZ

- 3-1 Why is it important to review a copy of the advertised contract? List at least four reasons.
- 3-2 Why should the Inspector and Engineer spot check construction staking?
- 3-3 (a) What do the letters AASHTO stand for?
(b) What are "AASHTO Specifications"?
- 3-4 Where can you obtain a copy of an advertised contract?
- 3-5 How can you determine whether there are any Government-furnished materials in the contract?
- 3-6 What testing equipment is necessary to check compliance for the following work items?
- (a) Pay item 203(03), excavation, placement method (3).
 - (b) Pay item 304(01), pit run aggregate, maximum size 3 inches, compaction A.
 - (c) Pay item 304(04), grid rolled aggregate, maximum size 2½ inches, compaction A.
 - (d) Pay item 304(07), screened aggregate, type-base, grading "X" on drawings, compaction A. Grading "X" requires 100 percent passing 2½-inch sieve, 30-70 percent passing 1-inch sieve, and 10-35 percent passing No. 4 sieve.
 - (e) Pay item 304(10), crushed aggregate, type-base, grading H, compaction B.
 - (f) Pay item 304(10), crushed aggregate, type-surfacing, grading J, compaction C.
 - (g) Pay item 203(01), excavation, placement method (1).
 - (h) Pay item 203(02), excavation, placement method (2).

- (i) Pay item 203(08), borrow excavation, placement method (3).
- (j) Pay item 603(01), 18-inch corrugated metal pipe, 0.064-inch thickness for steel or 0.060-inch thickness for aluminum.
- (k) Pay item 306(01), reconditioning of roadbed, compaction B.
- (l) Pay item 201(01), clearing and grubbing, slash treatment methods for tops and limbs (5), (6), (7), logs (8), and stumps (4).

- 3-7 Where might the Inspector or COR/ER find guidelines or environmental constraints pertaining to the project?
- 3-8 List the forms the Inspector should keep in adequate supply for timber sale road construction contract.
- 3-9 Why should an Inspector set up a separate folder or file for each assigned project?

CHAPTER 4

PREWORK CONFERENCE

REFERENCES

- (1) FSH 7709.11, Transportation Engineering Handbook.
- (2) FSH 6309.11, Contract Administration Handbook.

INTRODUCTION

After the timber sale or public works contract is awarded and before the actual work is started, the Contracting Officer shall schedule a meeting with the Contractor to review the general provisions, specifications, and administrative phases of the contract. This will get the project off to a good start by establishing a businesslike relationship with the Contractor. The COR/ER should be prepared to discuss the technical engineering aspects of the contract. The meeting shall be documented and a copy of the documentation shall be furnished to the Contractor.

MEETING ATTENDEES

- (1) Contracting Officer (presiding officer).
- (2) Forest Service Representative.
- (3) Contracting Officer's Representative/Engineering Representative.
- (4) Construction Inspectors.
- (5) Purchaser/Contractor.
- (6) Subcontractor.
- (7) Others indirectly involved with the contract, such as the Forest Supervisor, members of the Forest Staff, or the District Ranger.

the Meeting

GENERAL LANS CONTRACTS

General Provisions

Labor Laws

Technical Specifications

Drawings

Unusual Conditions of the Project

Contractor's Plan and Schedule of Operation

Maintenance of Traffic Safety

Contract Modification

Sanitary Provisions

Environmental Protection Practices

Staking Progress and Schedule

Inspection of Materials and Work Organization and Responsibility

of Government

Organization and Responsibility of Contractor

Line of Authority and Responsibility

Timber Sale Contracts

Specific Conditions of Sale (A-Division)

General Provisions of Sale (B-Division)

Special Provisions of Sale (C-Division)

Drawings and Specifications

Unusual Conditions of Sale

Contractor's Plan and Schedule of Operations

Maintenance of Traffic Safety

Purchaser Credit and Contract Cost Adjustments

Sanitary Provisions

Environmental Protection Practices

Staking Progress and Schedule

Inspection of Materials and Work Organization and Responsibility

of Government

Organization and Responsibility of Purchaser

Line of Authority and Responsibility

QUIZ

- 4-1 Is a prework meeting a requirement of the contract?
- 4-2 Who generally presides over the prework meeting?
- 4-3 What portion of the contract should the COR/ER be prepared to discuss?
- 4-4 Why is it important to get a Schedule of Operation from the Contractor?
- 4-5 During your absence, a Forest Service employee without contractual authority visits a project on which you are the COR/ER. The employee directs the Contractor to perform certain work not required in the contract. The Contractor complies with the request and then asks for payment for the requested work. Lines of authority were discussed at a prework meeting. How do you answer the Contractor?

CHAPTER 5 CONSTRUCTION WORK BEGINS

COMMONLY USED FORMS

See FSH 7709.11, Chapter 30, and FSH 6309.11.

REFERENCES

Certification Self-Study Courses:

- (1) Roads (EM-7115-510-100).
- (2) Aggregate Base and Surfacing (EM-7110-1e).
- (3) Concrete (EM-7110-1d).
- (4) Asphalt (EM-7115-507-100).
- (5) Bridges (EM-7115-508-100).
- (6) Sampling and Testing (EM-7115-509-100).

COMMONLY USED WORK ITEMS

The work items most commonly encountered in road construction contracts are:

Section 201 - Clearing and Grubbing
Section 203 - Excavation and Embankment
Section 304 - Aggregate Base and Surface Course
Section 306 - Reconditioning Existing Road
Section 603 - Metal Pipe

Section 201 - Clearing and Grubbing. The Inspector and COR/ER must know how to:

- (1) Determine clearing widths from the typical section detail.
- (2) Determine the specified method of slash treatment from the drawings and the Schedule of Items.
- (3) Locate and flag the areas on the ground if burying (5) or piling and burning (7) are specified.
- (4) Locate and flag the areas on the ground for decking unmerchantable material.

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See FSH 7709.11, Chapter 30, and FSH 6309.11.

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- (1) Roads (EM-7115-510-100).
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- (2) Determine the specified method of slash treatment from the drawings and the Schedule of Items.
- (3) Locate and flag the areas on the ground if burying (5) or piling and burning (7) are specified.
- (4) Locate and flag the areas on the ground for decking unmerchantable material.

- (5) Determine the requirements for disposing of merchantable timber from the Special Project Specifications.
- (6) Check that the clearing is adequately flagged sufficiently ahead of construction.
- (7) Determine the method of measurement and units of measurement from the Schedule of Items.
- (8) Ensure that stumps are left no higher than allowed in the contract.
- (9) Check to see that merchantable and unmerchantable timber is handled as specified.
- (10) Determine that slash disposal is accomplished in accordance with specifications. If burning is specified or allowed, make sure that piles are prepared and burned according to specifications and current burning limitations.
- (11) Check to see that construction stakes and reference stakes are being preserved during the clearing operations.
- (12) Track the Contractor/Purchaser's progress. Make measurements of accomplishment for progress payments.

The "what" and "when" to inspect have already been discussed. The "how" to inspect is best learned by actually doing, under the direction of a qualified Engineer. A few principles are listed below:

- (1) Plan ahead. Use the Contractor/Purchaser's Schedule of Operations, and plan your time and tests accordingly.
- (2) Inspect a portion of work promptly, as soon as it is ready for inspection, and notify the Contractor/Purchaser of the results.
- (3) Be precise when you inspect an item. For example, when you are inspecting dimensions, measure them--do not eyeball them. When you check for compliance, use the test or measurement specified in the contract and perform the test exactly as specified in AASHTO or other references.

- (4) Do not guess about answers when discussing contract requirements with the Contractor/Purchaser.

Section 203 - Excavation and Embankment. During the excavation and embankment work, the Inspector and COR/ER must:

- (1) Ensure that sufficient construction stakes remain after the clearing operation to adequately control excavation and embankment.
- (2) Determine borrow excavation needs from the drawings. Locate the borrow areas on the ground, and designate the limits.
- (3) Determine from drawings and Schedule of Items the method of placing embankment on each road section. Note any areas of controlled compaction and the required degree of compaction.
- (4) Note any special treatment areas such as slope rounding, subgrade treatment, or special finishing requirements shown on the drawings or in the Special Project Specifications.
- (5) Determine the construction tolerance class for each road section on the project as shown on the drawings. The table showing elements of all tolerance classes can be found in Section 203.16 of the 1979 Standard Specifications.
- (6) Determine that embankment layer thickness, width, and density requirements are met for each layer placed.
- (7) Determine that all ditch lines, lead-off ditches, berms, or other special features are constructed as specified on the drawings. Check grade, depth, and location.
- (8) Check construction progress against the construction stakes to determine whether a road is being built to the designed grades and elevations.
- (9) Make all necessary tests, measurements, and calculations to determine partial or final quantities.

Section 304 - Aggregate Base and Surface Course. The Inspector and the COR/ER must:

- (1) Understand the contract requirements for furnishing, hauling, and placing the courses of base and surfacing in the contract.
- (2) Understand the type of base or surface course production specified on the Schedule of Items (pit run, grid rolling, screening, or crushing).
- (3) Understand the gradation specified with tolerances from Subsection 703.06 and the Special Project Specifications. Note that Section 304 refers to Subsection 703.06 for aggregate materials requirements. Therefore, Subsection 703.06 becomes a part of the contract by reference.
- (4) Understand the quality requirements of the material (plasticity index, soundness, durability index, sand equivalent, dust ratio, percent wear, and fractured faces).
- (5) Determine whether any additions are required or anticipated for the finished product from notes on the drawings or the Special Project Specifications (for additives such as binder--locate and mark binder source).
- (6) Determine the depth of aggregate required on various road sections and compaction requirements.
- (7) Study the pit development plan in the drawings to understand how the source was planned for development.
- (8) Determine that limits of the source are clearly flagged or staked and that they agree with the pit development plan. Determine that the Contractor/Purchaser understands how the pit is to be developed, how clearing is to be handled, where stockpiles are allowed, and what final cleanup requirements are necessary.
- (9) Ensure that your quality testing equipment and supplies are available and are in good working condition.

(10) Prepare progress payment based on estimated percentages of planned quantities. The Inspector should make this estimate with the Contractor before submitting it to the COR/ER.

(11) If pay unit is by weight (tons), determine who provides the scales and weigh person.

During production, hauling, and placement:

(1) Test and closely inspect the product, and monitor the testing, if done by the Contractor. Provide results immediately to the Contractor/Purchaser, if applicable.

(2) Determine if the requirements of Subsection 304.08 are met prior to placing aggregate on a particular road segment.

(3) Measure the aggregate being produced, hauled, and placed by the method specified. Measurement could be by weight or volume. Volume measurement could be in place on the road, on the stockpile, or in the hauling vehicle.

(4) Determine whether aggregate is being placed to the depth and width shown on the typical section in the drawings. The Contractor/Purchaser is responsible for placing the proper depth and width of aggregate.

(5) Determine that the gravel is being mixed and placed properly on the road in order to obtain a consistent mixture without segregation.

(6) Test for compaction according to the requirements shown in the specifications. Immediately report test results and any nonconformance to the Contractor/Purchaser.

(7) If a stockpile is used, determine that stockpiling is done in accordance with Subsection 105.01. Aggregate shall be loaded, removed, and transported in a manner that will a specified gradation and avoid contamination. les should be built in layers to minimize particle :ion.

Section 304 - Aggregate Base and Surface Course. The Inspector and the COR/ER must:

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- (2) Understand the type of base or surface course production specified on the Schedule of Items (pit run, grid rolling, screening, or crushing).
- (3) Understand the gradation specified with tolerances from Subsection 703.06 and the Special Project Specifications. Note that Section 304 refers to Subsection 703.06 for aggregate materials requirements. Therefore, Subsection 703.06 becomes a part of the contract by reference.
- (4) Understand the quality requirements of the material (plasticity index, soundness, durability index, sand equivalent, dust ratio, percent wear, and fractured faces).
- (5) Determine whether any additions are required or anticipated for the finished product from notes on the drawings or the Special Project Specifications (for additives such as binder---locate and mark binder source).
- (6) Determine the depth of aggregate required on various road sections and compaction requirements.
- (7) Study the pit development plan in the drawings to understand how the source was planned for development.
- (8) Determine that limits of the source are clearly flagged or staked and that they agree with the pit development plan. Determine that the Contractor/Purchaser understands how the pit is to be developed, how clearing is to be handled, where stockpiles are allowed, and what final cleanup requirements are necessary.
- (9) Ensure that your quality testing equipment and supplies are available and are in good working condition.

(10) Prepare progress payment based on estimated percentages of planned quantities. The Inspector should make this estimate with the Contractor before submitting it to the COR/ER.

(11) If pay unit is by weight (tons), determine who provides the scales and weigh person.

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(3) Measure the aggregate being produced, hauled, and placed by the method specified. Measurement could be by weight or volume. Volume measurement could be in place on the road, on the stockpile, or in the hauling vehicle.

(4) Determine whether aggregate is being placed to the depth and width shown on the typical section in the drawings. The Contractor/purchaser is responsible for placing the proper depth and width of aggregate.

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(7) If a stockpile is used, determine that stockpiling is done in accordance with Subsection 105.01. Aggregate shall be stockpiled, removed, and transported in a manner that will preserve specified gradation and avoid contamination. Stockpiles should be built in layers to minimize particle segregation.

- (8) Make all necessary measurements and calculations to determine partial or final payment.

Section 306 - Reconditioning Existing Roadbed. The Inspector and COR/ER must:

- (1) Examine the drawings. Sections of the road requiring reconditioning must be shown on the drawings. Locate the areas requiring scarification, road intersections, and disposal areas for rock removed during scarification.
- (2) Determine the compaction requirements from the specifications.
- (3) Determine the method of measurement from the Schedule of Items and Section 106.

As work proceeds:

- (1) Determine that the scarification is accomplished, that roadbed and shoulders are shaped and compacted as specified, and that drainage structures function properly.
- (2) Measure accomplished work and determine partial or final payments.

Section 603 - Metal Pipe. The Inspector and COR/ER must:

- (1) Determine from the contract whether the Forest Service furnishes any of the metal pipe. If so, arrange a schedule for delivery with the Contractor.
- (2) Determine that pipe locations have been properly staked and that an as-staked pipe list has been furnished to the Contractor/Purchaser.
- (3) Inspect pipe delivered to the job site as soon as possible and obtain a copy of the manufacturer's certificate of compliance. This report is ordinarily sufficient to ensure quality control unless there is suspicion that the material is deficient.

Promptly notify the Contractor/Purchaser of any noncompliance. If doubt about the quality of the material exists, a sample of the material should be submitted by the Inspector or the COR/ER to the lab for testing.

- (4) Determine that structural excavation is performed according to the construction stakes.
- (5) For pipe installations in fishery streams, ensure that construction work is limited to periods shown on the drawings or in the Special Project Specifications.
- (6) Determine that bedding and camber conform to Subsection 603.04 and to the drawings.
- (7) While pipe is being laid, make sure that the size is as specified for that location and that the length meets field conditions.
- (8) Determine that the pipe is properly installed according to Subsection 603.
- (9) The COR/ER must approve excavation and foundation of certain pipes according to Subsection 603.08.
- (10) Make necessary measurements to determine partial or final quantities.

DAILY DIARY (6300-20)

This form is to be completed each day or shift by the Inspector or the COR/ER. The data to be recorded are explained on the form. Thorough and concise narratives are a necessary means for recording all significant daily events during the project. In instances of claim or dispute, an accurate record is valuable for reconstructing the sequence of events and the decisions made leading up to the disagreement. Diaries are used often in court cases to support or refute testimony.

Diaries completed by the Inspector must be submitted as soon as possible to the COR/ER, who then reviews the notes, adds any comments, and initials them. The COR/ER forwards a copy to the Contracting Officer for inclusion in the official project folder. The COR/ER

- (8) Make all necessary measurements and calculations to determine partial or final payment.

Section 306 - Reconditioning Existing Roadbed. The Inspector and COR/ER must:

- (1) Examine the drawings. Sections of the road requiring reconditioning must be shown on the drawings. Locate the areas requiring scarification, road intersections, and disposal areas for rock removed during scarification.
- (2) Determine the compaction requirements from the specifications.
- (3) Determine the method of measurement from the Schedule of Items and Section 106.

As work proceeds:

- (1) Determine that the scarification is accomplished, that roadbed and shoulders are shaped and compacted as specified, and that drainage structures function properly.
- (2) Measure accomplished work and determine partial or final payments.

Section 603 - Metal Pipe. The Inspector and COR/ER must:

- (1) Determine from the contract whether the Forest Service furnishes any of the metal pipe. If so, arrange a schedule for delivery with the Contractor.
- (2) Determine that pipe locations have been properly staked and that an as-staked pipe list has been furnished to the Contractor/Purchaser.
- (3) Inspect pipe delivered to the job site as soon as possible and obtain a copy of the manufacturer's certificate of compliance. This report is ordinarily sufficient to ensure quality control unless there is suspicion that the material is deficient.

Promptly notify the Contractor/Purchaser of any noncompliance. If doubt about the quality of the material exists, a sample of the material should be submitted by the Inspector or the COR/ER to the lab for testing.

- (4) Determine that structural excavation is performed according to the construction stakes.
- (5) For pipe installations in fishery streams, ensure that construction work is limited to periods shown on the drawings or in the Special Project Specifications.
- (6) Determine that bedding and camber conform to Subsection 603.04 and to the drawings.
- (7) While pipe is being laid, make sure that the size is as specified for that location and that the length meets field conditions.
- (8) Determine that the pipe is properly installed according to Subsection 603.
- (9) The COR/ER must approve excavation and foundation of certain pipes according to Subsection 603.08.
- (10) Make necessary measurements to determine partial or final quantities.

DAILY DIARY (6300-20)

This form is to be completed each day or shift by the Inspector or the COR/ER. The data to be recorded are explained on the form. Thorough and concise narratives are a necessary means for recording all significant daily events during the project. In instances of claim or dispute, an accurate record is valuable for reconstructing the sequence of events and the decisions made leading up to the disagreement. Diaries are used often in court cases to support or refute testimony.

Diaries completed by the Inspector must be submitted as soon as possible to the COR/ER, who then reviews the notes, adds any comments, and initials them. The COR/ER forwards a copy to the Contracting Officer for inclusion in the official project folder. The COR/ER

should also complete a diary when visiting the project. Diaries should be sent to the Contracting Officer weekly.

WORK ORDER OR NOTICE OF
NONCOMPLIANCE
(6300-12)

This is a dual purpose form for construction contracts. The form can be used by the COR as a work order to direct the Contractor's work. When the appropriate box is checked, the form also can be used to notify the Contractor of noncompliance of materials or workmanship. Generally, the Inspector's authority is limited to the Notice of Noncompliance.

When issuing a Notice of Noncompliance, the Inspector must carefully describe in writing the portion and location of work that does not meet contract requirements, list the contract clause or drawing that applies, and record the results of any tests performed. Notice that the Contractor's representative signs at the bottom of the form, signifying that the notice has been received.

After properly issuing a Notice of Noncompliance, the Inspector notifies the COR/ER by providing a copy of the notice so that appropriate action can be taken. Actual rejection of work and any work suspension are the COR's responsibilities.

SPECIFIED ROAD CON-
STRUCTION AGREEMENT
&/or NOTICE of NON-
COMPLIANCE (7700-42)

Form 7700-42 was designed for timber sale contracts. The form is to be used by the Construction Inspector to inform the Purchaser's representative of noncompliance. Make sure that the Purchaser's representative deletes one of the two statements immediately above the signature block. For a Notice of Noncompliance, the Purchaser's representative should delete the statement "I agree on behalf of Purchaser," since agreement is not required.

PROJECT CONTROL

The term "project control" usually refers to construction stakes, flagging, elevation bench marks, and other references that define the horizontal and vertical limits of the work. The road must be staked well enough for it to be constructed as designed. The project control stakes, ribbons, and references allow the Forest Service to check the progress of work. The Contractor/Purchaser is required to preserve or replace a sufficient amount of the stakes to guide his operation. The Contractor/Purchaser is also responsible for checking his own work to ensure its compliance. The tests and measurements are designed to ensure compliance with the contract specifications.

All deficiencies must be communicated to the Contractor in a timely manner. The Inspector and the COR/ER must understand the project staking and flagging requirement, and they must be able to set slope stakes in order to check the Contractor's work. Construction staking may include setting the centerline, slope stakes, culvert location stakes, and bench marks for elevation control.

The precision of the construction staking is specified in the standard specifications. Construction staking for a high-standard road, which is going to be paved with bituminous material, requires more precise control of width, grade, and elevation.

CONTROL of STRUCTURES

A structure requires more control than the roadway. As a general rule, the Forest Service must provide:

- (1) The centerline (horizontal) alignment through and on both sides of the structure, and one abutment centerline.
- (2) A specified elevation at one point on the structure.
- (3) A beginning point (the L-station where the structure begins).
- (4) At least one bench mark with a project elevation.

With this control and a properly dimensioned set of drawings, the Contractor/Purchaser can build the structure. Any other staking is the Contractor/Purchaser's responsibility. The Inspector and COR/ER will check dimensions, locations, and elevations to ensure that the structure is constructed according to the plans. The COR/ER will spot check to ensure that the engineering is done properly.

The Contractor/Purchaser is responsible for all intermediate control required for construction and is responsible for the preservation of all stakes and control points. The cost of replacing the stakes will be the responsibility of the Contractor if they are destroyed because of the Contractor's negligence.

Some contracts require the Contractor/Purchaser to stake the project. Inspect for precision and completeness of the staking work as you would any other work. The construction staking specifications will indicate the methods and accuracies.

SAFETY

The COR/ER must become familiar with OSHA's Construction Industry Manual. Sections in this manual relate to medical services (such as first aid; sanitation; head, hearing, and eye protection; safety belts; equipment; and alarms).

If a situation arises wherein the Contractor violates OSHA standards and there is an immediate threat to human lives, the COR/ER must notify the Contractor immediately. If the Contractor ignores the situation, the COR/ER must exercise judgment and issue a stop work order, if necessary. Ideally, the situation will be corrected, but if the problem continues, the COR/ER must notify the Contracting Officer.

RECORDKEEPING

Several forms are important tools for documenting data and notifying the Contractor and the Contracting Officer.

At this point, you should carefully read the following references pertaining to records, reports, and forms used in contract administration:

- (1) Chapter 70 of the Contract Administration Handbook, FSH 6309.11.
- (2) Chapter 30 of the Transportation Engineering Handbook, FSH 7709.11.

These references explain the use of forms commonly used in construction inspection. Notice that some different forms are used for public works and timber sale contracts.

SAMPLING & TESTING

In addition to the standard forms discussed above, a number of "informal" forms are used to calculate aggregate gradations, moisture-density values, or asphalt content. Some National Forest Engineering groups develop their own forms for documenting the results of compliance tests required by the contract.

Standard tests performed by the Government to check the Contractor's work for compliance are for the Government's benefit and are not intended to serve as quality control testing for the Contractor. However, the Forest Service does provide the Contractor with a courtesy copy of the test results. When test results are given to the Contractor as a courtesy, the date and time the results were

SUMMARY of COMPLIANCE TESTS

This section is intended to serve as a summary of the various compliance tests that may be required for work items in Sections 203, 304, and 603. This list should be checked against the specifications in each particular contract. It is advisable when planning your inspection effort to make a list of equipment, supplies, and manpower needed.

Section 203. Excavation and embankment controlled compaction (Subsection 203.15(b)):

AASHTO T-99, T-180

AASHTO T-191, T-205, T-217 or T-239, T-224

Section 304. Aggregate base and surfacing aggregate quality (Subsection 703.06), including gradation:

AASHTO T-96, T-210, T-89, T-90, T-11, T-27, T-176

Compaction (Subsection 304.10):

AASHTO T-99, T-180

AASHTO T-191, T-205, T-238, T-239, T-224

Section 603. Metal Pipe Materials Requirements (Section 707). These materials specifications must be met by the manufacturer and fabricator. All pipe must have certification that it meets AASHTO specifications.

The AASHTO Materials Standards are M 218, M 196, M 36, M 243, and .90.

QUIZ

- 5-1 You are the Inspector on 10 miles of reconstruction, and the Contractor is in the process of laying rock. As you drive up to the project, you see a gravel truck which has backed up a car belonging to John Q. Public. You notice no signs of flagmen at the site, which is being used as a turnaround. What should you do if the contract is a--
- (a) Timber sale contract?
 - (b) Public works contract?
- 5-2 The Contractor/Purchaser constructing roads is still working after the end of the normal operating season. The normal operating season is May 25 to September 30.
- (a) Does the contract permit the Contractor/Purchaser to do this?
 - (b) The Forest Service expects the rainy season to start October 1. What action should the Forest Service take?
- 5-3 For a public works contract:
- (a) When does contract time start?
 - (b) When is the Contractor required to start work?
 - (c) What do you do if the Contractor is apparently not beginning work on the project?
- 5-4 You arrive on the job Monday morning at 8 a.m. to find the Contractor just finishing a fill over a 57-inch by 38-inch pipe arch in a dry draw that runs water during the rainy season. The Contractor did not notify you of this. As Inspector, what should you do?
- 5-5 As Inspector, you visit a job site and find the Purchaser is burning slash. You ask to see the burning permit. The Purchaser shows it to you, and you notice that it indicates termination of burning last week. What do you do?

5-6 The Contractor is burning construction slash on a day when the Forest has closed all open burning because of the Fire Hazard Rating at 5 p.m. the previous day. You order the Contractor to tear the slash piles apart and extinguish them. The Contractor refuses because the COR should have notified him of a change in the Fire Hazard Rating 24 hours in advance. What can you do?

5-7 The road is being built on a right of way across private land. During the clearing operation you notice pieces of debris more than 3 inches long scattered outside the right of way. What course should be taken under a--

(a) Public works contract?

(b) Timber sale contract?

5-8 An opted timber sale had a completion date of May 26, 1982, for designated roads. The public works contract that was awarded to do the work was begun on July 1, 1981, and had a 210-day contract time. Shutdown was on November 1, 1981, and there was no contract time adjustment. What would have been the latest acceptable completion date?

5-9 The Schedule of Items calls for the method of measurement for Item 305(01), placing aggregate, compaction D, to be VQ. You note that the hauling vehicles appear to be only three-quarters full. What action should you take?

5-10 The Purchaser tells the ER that reconstruction is "substantially completed" (one-half of the base course is placed) and, therefore, that the hauling of included timber can begin. The ER tells the Purchaser that no timber can be hauled until the reconstruction is completed. The Purchaser says the contract states that "construct" includes "reconstruct" and, therefore, "substantially completed" applies to both new and existing roads.

(a) Who is right?

(b) Why?

5-11 Staking is specified as precision C. You have spot checked the staking in numerous areas and have had several corrections made. The Contractor requests subgrade approval to haul the base course on the day after tomorrow. The Contractor also mentions that they cannot build a 1,300-foot stretch according to the stakes, and asks what you are going to do about it. You check what is left of the staking within the 1,300-foot stretch and find that nothing checks or agrees with anything.

(a) What do you recommend to the COR?

(b) What do you do as the COR?

5-12 Drawings require 1.0 mile of new construction with the roadbed to be unsurfaced. Borrow material encountered during construction is not adequate for a running surface. What action do you take under a--

(a) Timber sale contract?

(b) Public work contract?

5-13 The existing Forest Service road between the designated rock source and the road construction project is breaking up. In addition, a large slide has blocked the road to any travel. It is October 15, and the operating season for timber sales is May 1 through November 30. How should the Forest Service handle this problem under a--

(a) Timber sale contract?

(b) Public works contract?

5-14 As Inspector on a road construction project, you are checking compaction with the nuclear gage. The Contractor is placing and compacting 1-inch minus aggregate graded according to a Forest Special Project Specification. Compaction method "B" is specified. Although the moisture content of the material is optimum, compaction is only 90 percent of maximum after several

passes with a static roller. You ask the Contractor to roll a test strip. After 8 passes of the roller, compaction is still low. On the 10th pass, the aggregate is displacing.

- (a) What is the problem?
- (b) What course of action would you take?

5-15

Item 306(01), reconditioning of roadbed, compaction A, is included in a road contract for placing 6 inches of Item 304, crushed aggregate base course. After work on Item 306 is completed and prior to beginning placement of Item 304, numerous rocks over 6 inches in diameter that extended 1 1/2 inches above the subgrade are noted. Does subgrade meet specification?

5-16

There are four roads on a timber sale that has an Item 603(02) for 18-inch culvert on the Schedule of Items. On Road 10, the design quantity is 60 feet, on Road 20 the quantity is 60 feet, on Road 30 the quantity is 100 feet, and on Road 40 the quantity is 120 feet, for a total of 340 feet of culvert.

On Road 10, a total of 40 feet of culvert is added on the installations; on Road 20, 15 feet of culvert is added on the installation; on Road 30, additional culvert installation of 40 feet is added; and on Road 40 a total of 16 feet on the design installations is deleted. All of the above was documented prior to work on the culvert.

- (a) How is the Contractor paid for actual quantities of culvert on a timber sale contract?
- (b) How is the Contractor paid on a public works contract?

5-17

You are designated as the Inspector on a timber sale road that was opted back to the Forest Service by the Purchaser. Staking is being done by the Forest Service. The staking crew reports 15 days prior to opening the public works bids that they have discovered an error in the topography that will increase excavation from 20,000 cubic yards to 28,000 cubic yards. What should you do?

5-18 In the process of inspecting the Contractor's work at a critical creek crossing, you find that most of the construction staking at the site has been destroyed. You advise the Contractor of this, yet the Contractor believes the road can be rebuilt without the staking. The Contractor also claims that vandals, not the construction operations, were responsible for the destroyed staking. As Inspector, what action would you take?

5-19 The awarded contract specifies that the excavation will be paid by the station and that the clearing payment is lump sum for each $\frac{1}{2}$ mile of road construction. The centerline of the road is marked on the ground, no plan and profile is shown, but turnout locations are given in a listing. Clearing limits are shown as 15 feet from centerline or 5 feet from shoulder or top cut slope, whichever is greater. When you check the subgrade for approval, you find trees inside the edge of the shoulder on the turnouts. Clearing tags are evident, and the clearing is completed back to these tags. The Contractor tells you that these tags were in place when the contract was up for bid and that clearing beyond that will require additional payment. More clearing is needed. Investigation reveals the Forest Service marked the clearing.

(a) What can the Forest Service do within a public works contract?

(b) What can the Forest Service do within a timber sale contract?

5-20 The Forest Service guarantees access to the project and is responsible for road maintenance. The Forest Service road between the project and the rock source is breaking up. In addition, an earth slide on the road has blocked the road to all vehicles. The public works Contractor has 12,000 more yards of surface rock to lay down on a rock subgrade to complete the project. The weather is wet but not freezing.

(a) What effect do these conditions have on the Contractor's operation?

(b) What should the Forest Service do?

5-21 Construction of a full bench road requires haul to a waste area. Payment is to be made under 203(02) on design quantities. The Contractor notifies you that the design quantities are in error and supports this notification with a daily tabulation of truck capacities, number of loads hauled, and a statement that each truck carried a capacity load. By the Contractor's computation, he has hauled almost 60 percent more than the design quantity. The material excavated is approximately 60 percent rock and 40 percent soil. How do you reply to the Contractor?

5-22 Comparisons of planned and staked quantities, balance points, and average haul on an awarded contract are:

	Planned	Staked
Excavation (cubic yards)	191,000	227,000 (+19%)
Balance points	65	37
Average haul distance (feet)	400	705 (+76%)
Longest haul distance (feet)	750	1,900

Excavation is to be paid on design quantities.

(a) What are the implications of this situation?

(b) What should the Forest Service do?

5-23 A borrow source designated for this contract has been depleted with 15,000 cubic yards still needed. A new source is found 1 mile further from the project.

(a) How can this be handled and what allowances can be made in Purchaser credit under a timber sale contract?

(b) How can this be handled and what allowances can be made in cost under a public works contract?

5-24 You have reviewed the quantities (paid by actual quantities) and computations for surfacing on a contract and found that the conversion from cubic yards to tons will result in less

surfacing depth than is indicated on the typical sections. Approximately 10,000 tons of rock will be needed to correct this error.

- (a) How can this be corrected and paid for on a timber sale contract?
- (b) How can this be corrected and paid for if the road construction has been opted?

5-25 Because of a level bust, a road designed with 700 feet of +20 percent gradient on a ridge top constructs out at 23-percent roadway gradient. You cannot relocate off the ridge. The Contractor is not concerned and will haul rock on the road. A change in design to result in a +20-percent grade will require excessive additional excavation and a structure at the bottom to contain fill. What alternatives are available to the Government?

5-26 During an inspection you find that the road width exceeds the tolerance limit by 2.0 feet for each 1,000 feet. What do you do?

5-27 Jo-Bo timber sale roads included a project that requires "DQ" 20,000 tons of crushed aggregate. The Contractor claims to have placed 25,000 tons of aggregate on the road and has the weight slips to prove it. The Contractor wants \$7.00 a ton for the 5,000 tons. Do you allow for additional rock if--

(a) It is a timber sale, Purchaser credit allowance was \$6.00 a cubic yard for the 20,000 yards, and the Contractor demands adjustment under C5.251?

(b) It is an opted timber sale road, the bid price was \$6.00 a cubic yard, and the Contractor demands adjustments under clause 3 of 23-A?

5-28 During construction of the only road in the timber sale contract, a design change is processed that adds \$130,000 of purchaser credits for subgrade stabilization. The original purchaser credits were \$280,000. The original road completion date was August 1, 1984, and the sell date of the timber sale contract was June 1, 1982. The purchaser says he needs more time to finish the road work.

(a) Can we allow more time?

(b) How can this be done and who has the authority to approve it?

5-29 A road is located and surveyed along one side of a ridge, across steep side slopes and unstable ground. The purchaser sees an alternate route on the opposite side of the ridge on better ground. The new location would still require the first 1/2 mile of the original location and would reach the same destination. The Forest Service agrees that the new location would be advantageous because of a reduction in cost and reduced impact on resources. The purchaser does not want to stand the cost of additional survey, design, and construction staking and does not make a formal request for an alternative facility.

(a) Would you pursue the new location and reduce the length of the proposed road?

(b) How would the change be handled?

5-30 You arrive at a road reconstruction project to find that trees are being felled across the roadway without any warning signs or a flagger. As Inspector, what would you do?

5-31 On a public works contract, the Inspector discovers two caterpillar tractors working outside the designated clearing limit within an area (marked on the ground) around designated wildlife reserve trees. What action should be taken?

5-32 The fish biologist visited a project on which road construction was in progress and became quite excited by the project's operations. The biologist told the Contractor/Purchaser that clearing the stream was in violation of damage provisions of the contract and that the operations should be discontinued. You arrive at the job and the Contractor/Purchaser relates to you what happened and states that he has no intention of stopping any of the equipment. As Inspector, what action would you take?

5-33 The Schedule of Items includes the following:

Item	Description	Method of Measurement	Unit	Quantity
170(02)	Construction Staking P-Line offset, Precision	AQ	Mi.	1.0
203(03)	Excavation, Placement Method 5-3)	DQ	C.Y.	10,000

After the project is slope-staked, the road builder notifies you that the staked quantities for Item 203(03) amount to 10,970 cubic yards and requests compensation for that amount. What is your answer?

5-34 You are a COR/ER on a culvert installation project. During the culvert excavation, the Contractor encounters material that cannot be used for bedding material. The Contractor then buys bedding material from an outside source and presents you with weight slips and an invoice. The Contractor says he just wants to be paid for what it cost him. There is no pay item for bedding material in the contract. What course of action do you take?

5-35 You are the COR on the Hayseed Opted timber sale contract. The contract has been awarded and work is scheduled to begin in 5 days. The Contractor tells you he would like payment for his performance in payment bonds, which were required. As COR what do you do?

- 5-36 You are the COR on an opted timber sale contract. The project is located in your State. At the prework meeting, you notice that the wage rates in your copy of the contract are for an adjacent State. As COR, what do you do?
- 5-37 You are the ER on a timber sale. Three weeks ago you submitted a design change deleting a 24-inch by 44-inch corrugated metal pipe not needed at Station 5+00. This change has been approved by both the Forest Service and the Purchaser. The deleted culvert was priced at \$28.00 per linear foot.
- Now you find a need to add a culvert to handle a previously unsuspected spring at Station 9+00. This location also required a 24-inch by 44-inch corrugated metal pipe, however, when costed with the current cost guide, the price is \$26.00 per linear foot. The Purchaser objects to installation at a price cheaper than the original contract price, and contends that you are just shifting the culvert from 5+00 to 9+00, and refuses to sign. What should you do?
- 5-38 You are the designated COR/ER on a road construction project. The Contractor is responsible for construction staking. After staking has been completed and approved, vandals destroy the stakes in a 600-foot segment of roadway. The Contractor will replace the stakes but wants additional payment for the work. What is your response?
- 5-39 You are the designated COR/ER on a road construction project. The Contractor delivers culvert pipes to the project site for later installation and is paid for the material. During the winter, several lengths of corrugated metal pipe are stolen from National Forest land. Who is responsible for replacement?
- 5-40 The Contractor's road construction operation has been stopped for 9 consecutive calendar days because of a design change. The Contractor requests more contract time and also requests to be paid for the time his equipment has had to stand idle.
- (a) As COR, what should you do?
- (b) As ER, what should you do?

CHAPTER 6 AFTER WORK IS COMPLETED & ACCEPTED

REFERENCES

- (1) FSM 7700, Transportation System.
- (2) FSH 7709.11, Transportation Engineering Handbook, Chapter 30.
- (3) FSH 6309.11, Contract Administration Handbook.
- (4) Forest Service 1979 Standard Specifications for Construction of Roads and Bridges

AS-BUILT DRAWINGS

A set of as-built drawings for the Forest's development road file must be finalized. This set must include final centerline locations, grades, aggregate depths, culvert locations and dimensions, turnout locations, final quantities, and other records.

REVIEWS & INSPECTIONS

Make a final acceptance inspection of specified road construction by a team consisting of:

- (1) The Contracting Officer or his representative.
- (2) The Contracting Officer's Representative/Engineering Representative.
- (3) An Engineer, designated by the Forest Supervisor, who has not been associated with the construction as COR/ER or Inspector.
- (4) The District Ranger or a designated representative.

Prepare an inspection team report signed by the COR/ER and designated Engineer certifying the extent of conformity of the road or road portion to the contract drawings, specifications, and other requirements and recommending for or against acceptance. Submit the report on timber sale contracts to the District Ranger and the report on public works contracts to the Contracting Officer who is responsible for notifying the Contractor/Purchaser in writing of acceptance or rejection of the road or road portions. If the road is not accepted, the notice shall include a work list (supported with appropriate contract references) detailing items to be completed before acceptance.

6-10

After you have prepared the final progress estimate for the Contractor's signature, the Contractor will not approve it because the quantities calculated for Item 205A(01), haul, station yard, and 205A(02), haul, cubic yard mile, are not correct. You tell the Contractor that the calculations were based on a split at station 26+40 because that is the way it was done for the design. The Contractor says that it is not part of the contract, that nothing on the drawings shows the distance to be used, and that additional payment should be made for 205(01). What should you do?

6-11

The road is ready for final inspection, but heavy rains wash out a culvert and its approach fill. A review of the culvert design shows that there was an error in drainage area computations and the culvert specified and installed was only one-half the diameter it should have been. How do you correct this and who assumes financial liability for redoing the work--

(a) Under a public works contract?

(b) Under a timber sale contract?

CHAPTER 7 PROTESTS, CLAIMS, DISPUTES, & APPEALS

REFERENCES

The Contract Disputes Act of 1978 (P.L. 95-563)

INTRODUCTION

The responsibility for handling formal protests, claims, disputes, and appeals is delegated to the Contracting Officer and cannot be delegated to others. However, as COR/ER or Inspector, you should be aware of the provisions applicable to such procedures. Most misunderstandings can be settled without the necessity of a formal dispute, and resolving these conflicts is an important role of both the COR/ER and the Contracting Officer. Claims and appeals are expensive ventures, and it is essential that all members of the contracting team do their best to prevent such occurrences. In a given situation, you may find it impossible to avoid a formal dispute or claim without deviating from the contract requirements. To do this would not be fair to other bidders. However, Forest Service contracts provide for considerable latitude in enforcement by means of change orders; and to prevent claims and disputes or appeals, we are expected to be reasonable and fair--to the Contractor, the Government, other bidders, those who may have bid had certain conditions not existed, and the taxpayer. We may not always satisfy the Contractor or prevent a claim or dispute as a result of our actions, but we will certainly not be reprimanded for being fair, reasonable, and acting in the best interest of the Government.

The policy of the Forest Service, as established by the Contract Disputes Act, is to settle all disputes and misunderstandings by mutual agreement. If the COR/ER can settle a dispute to the satisfaction of the Contractor and still enforce the provisions of the contract, this should be done without referral to the Contracting Officer. However, if doubtful about the proper or fair settlement, the COR/ER should consult the Contracting Officer, who is obligated to make a fair and unbiased final determination. Further remedy is provided to the Contractor through the appeals board and various courts. It is advisable to study the Contract Disputes Act of 1978.

QUIZ

7-1 During construction, unsuitable material has been discovered that must be removed from a roadway backslope. The Contractor refuses to lay the slope back and provide the rock overlay required by the new design. Road construction and maintenance is not practical unless backslope work is performed.

- (a) How can this be handled under the timber sale contract?
- (b) How can this be handled if the road work has been opted?

CHAPTER 8 SUMMARY

The Inspector and the COR/ER are an important part of the Forest Service team charged with the protection and development of National Forest resources. The two work in partnership on construction contracts and on timber sale contracts to ensure that the construction work is done in accordance with the specifications. Both must be thoroughly familiar with the project, must make compliance tests accurately and promptly, and must notify the Contractor/Purchaser when work does not comply with the contract. In addition, detailed records on work progress must be kept.

To perform those duties fully, the Inspector must be prepared technically for the job. The Inspector and COR/ER must correctly anticipate the tasks to be performed and make the most efficient use of time. The inspection job is a demanding one. Inspection and administration require hard work.

The Inspector and the COR/ER's relationship with the Contractor must be professional and businesslike at all times. Keep the following things in mind when dealing with the Contractor:

- (1) Do not operate the Contractor's equipment.
- (2) Minimize "buddy-buddy" relationships.
- (3) Do not accept any gratuities.
- (4) Professional discussions are encouraged at all times, including:
 - (a) Discussions in depth about test results.
 - (b) Suggestions about the work (but do not tell the Contractor how to do his work).

- (c) Discussions about the work schedule and progress.
- (d) Discussions about resource damage and how it is to be interpreted.

CHAPTER 9

TRAINING EVALUATION

INTRODUCTION

The purpose of this chapter is to aid the work supervisor in identifying areas of additional training needed by the trainee. The supervisor looks at the results of the chapter tests, hands-on experience, and discussions and tries to identify indicators of training needs. These are filled in on the training record (see figure 9-1 for a cut sheet that may be reproduced). An example might be "trainee had difficulty with sieve analysis calculations" or "trainee had difficulty with change orders." The supervisor then tries to identify the reason or reasons for the difficulties by looking for trends in the indicators or by further discussion with the trainee. An example might be "trainee lacks basic math skills" or "trainee has difficulty reading and interpreting AASHTO specifications well enough to perform standard tests." We should analyze closely the difficulties so we can treat the cause, not just the symptoms of the problems.

The supervisor identifies areas of additional, more intensive training needs.

(a) Performance of hands-on exercises.

(b) Results of chapter tests and discussions between trainee and supervisor.

The supervisor and trainee select, schedule, and accomplish training.

TRAINING RECORD				
Basic Knowledge Deficiency Basic Skill Deficiency (be as specific as possible)	Indicators of Training Needed	Training Exercise To Be Used in Strengthening Performance	Date Planned	Date Accomplished
<p>The training exercises above have been identified, scheduled, and accomplished to the acknowledged engineering standards and to the satisfaction of the work supervisor.</p> <p>Trainee Signature _____ Supervisor Signature _____</p>				

Figure 9-1.--Training record.

PERFORMANCE

After selecting, scheduling, and accomplishing training, the trainee should--

- (1) Be able to perform each one of the hands-on exercises shown in the schedule of exercises in the beginning of this guide. The trainee must be able to perform each one to the accepted engineering standard.
- (2) Understand how to inspect each of the work items on a road construction contract.
- (3) Be familiar with the major documents in public works and timber sale contracts.
- (4) Know the proper Manual and Handbook references for road construction work.
- (5) Know which actions to take under certain circumstances in contract administration.

The trainee now has the basic skills and knowledge to perform on a road construction project. The trainee needs only to actually perform the duties on a project under the supervision of the work supervisor.

Performance Validation

The trainee should be assigned to a project as Road Inspector or COR/ER trainee. The project should be a regular Forest Road construction or reconstruction project, and it can be a new or an ongoing project. The assignment period should be long enough for the trainee to perform the individual performance items listed on the performance validation worksheet (see figure 9-2).

As the trainee completes each of the performance items, the work supervisor initials the "Date Performed" column. The supervisor indicates the level of proficiency attained for that item by circling the appropriate number. The levels of proficiency are as follows:

NumberLevel of Proficiency

- 1 EXTREMELY LIMITED: Can do simple parts of task; needs to be told or shown how to do most of the task; needs extremely close supervision. Definitely needs more training.
- 2 PARTIALLY PROFICIENT: Can do most parts of task; needs help only on hardest parts; may not meet demands for speed and accuracy; needs close supervision.
- 3 COMPETENT: Can do all parts of task; needs only spot check of completed work; meets demands for speed and accuracy; needs normal supervision.
- 4 HIGHLY PROFICIENT: Can complete task quickly and accurately; can direct others in how to do the task; needs normal supervision; anticipates possible problems; and initiates corrective action within authorities.

The next task is to schedule, conduct, and document short critiques with the trainee. Review progress since the last critique. Discussion should center on such items as level of proficiency attained so far, problems affecting performance, items discussed in previous critiques, and anticipated problems. The purpose is to resolve any difficulties, to give both trainee and supervisor a progress report, and to provide encouragement for successful completion. To document the critiques, use the periodic critique record form (see figure 9-3).

The critiques should be held at least once every 2 weeks for about 15 minutes. These critiques are the key to holding the in-training experience together. How well they are used will determine how effective the learning experience is.

PERFORMANCE VALIDATION WORKSHEET

Trainee: _____

Project Name: _____

Miles of Road Construction or Reconstruction: _____

Work Items Included in Project: _____

Assignment Period: _____

To _____

Work Supervisor: _____

Public Works Timber Sale: _____

Individual Performance Items

- (1) Obtain letter of designation.
- (2) Obtain complete copy of contract.
- (3) Prepare project's contract files.
- (4) Obtain forms and technical references needed.
- (5) Attend prework conference.

Date Performed
(Initials/Comments)

Level of Proficiency
Attained
(Circle One)

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nce testing.

heet.

Individual Performance Items	Date Performed (Initials/Comments)	Level of Proficiency Attained (Circle One)			
(c) Determine frequency of inspection.		1	2	3	4
(d) Determine need for number of Inspectors.		1	2	3	4
(e) Locate office space and facilities needed for staying in field.		1	2	3	4
(f) Arrange for telephones and radios needed.		1	2	3	4
(8) <u>Safety and Health</u>					
(a) Obtain equipment needed (including first aid kits).					
(b) Obtain first aid training.		1	2	3	4
(c) Prepare hazard analysis for project (FS 6700-7).		1	2	3	3
(9) <u>Inspect Clearing and Grubbing, Item 201</u>					
(a) Ensure that clearing limits are clearly marked in advance of Contractor's operations.		1	2	3	4
(b) Determine if operations are being confined to clearing limits.		1	2	3	4
(c) Determine that merchantable timber is treated properly.		1	2	3	4
(d) Determine that debris disposal is completed on a section of project according to specifications.		1	2	3	4

Figure 9-2. (cont.)--Performance validation worksheet.

Individual Performance Items		Date Performed (Initials/Comments)	Level of Proficiency Attained (Circle One)		
(e) Ensure that pioneer roads are confined within roadway.			1	2	3
(10) <u>Inspect Excavation and Embankment, Item 203</u>					
(a) Ensure that construction stakes are in place in advance of Contractor's operations.			1	2	3
(b) Determine that pioneer roads are confined within roadway.					
(c) Determine that cuts and fills are begun at proper points.			1	2	3
(d) Locate any borrow areas on the drawings, designate them on the ground, and survey original topography.			1	2	3
(e) Measure quantities as required for items in Schedule of Items.			1	2	3
(f) Measure dimensions of work (widths, grades, and depths) to check for compliance with specifications.			1	2	3
(g) Measure relative density of placed embankment and check compliance with specifications.			1	2	3
(h) Check grade from a slope stake and determine if cut-and-fill slope and grade elevation are in compliance with plans.			1	2	3
			1	2	3

Figure 9-2. (cont.)--Performance validation worksheet.

Individual Performance Items	Date Performed (Initials/Comments)	Level of Proficiency Attained (Circle One)
(f) Determine that lead-off ditches, berms, or other special features have been constructed according to the drawings.		1 2 3 4
(11) <u>Inspect Aggregate Base and Surfacing,</u> <u>Item 304</u>		
(a) Ensure that subgrade (or base) is approved in writing for aggregate placement.		1 2 3 4
(b) Sample crushed material from crusher according to AASHTO T-2.		1 2 3 4
(c) Perform and calculate sieve analysis data per AASHTO T-11 and T-27.		1 2 3 4
(d) Perform and calculate Atterberg limits per AASHTO T-89 and T-90.		1 2 3 4
(e) Calculate sand equivalent value from given basic data.		1 2 3 4
(f) Calculate dust ratio from sieve analysis data.		1 2 3 4
(g) Explain in own words how percent wear is determined per AASHTO T-96 and what test results represent.		1 2 3 4
(h) Explain in own words the results of AASHTO T-210, "Production of Plastic Fines in Aggregates."		1 2 3 4

Figure 9-2. (cont.)--Performance validation worksheet.

Individual Performance Items	Date Performed (Initials/Comments)	Level of Proficiency Attained (Circle One)
(i) Explain in own words how "fractured faces" is determined for crushed gravel.	_____	1 2 3
(j) Perform in-place density tests by AASHTO T-238; calibrate meter and calculate relative density.	_____	1 2 3
(k) Perform in-place moisture content by AASHTO T-239; calibrate meter and determine percent moisture of aggregate.	_____	1 2 3
(l) Calculate dry weight of crushed aggregate by oven drying a sample.	_____	1 2 3
(m) Calculate exact volume of aggregate hauling vehicle.	_____	1 2 3
(n) Calculate the road spread distance for a load of aggregate.	_____	1 2 3
(o) Measure width, length, and depth of placed aggregate to determine quantities.	_____	1 2 3
<u>Conditioning Existing Roadbed,</u>		
mine and designate locations, is, and widths of any scarification.	_____	1 2 3
orm relative density (compaction) test following AASHTO T-99.	_____	1 2 3

nt.)--Performance validation worksheet.

Individual Performance Items	Date Performed (Initials/Comments)	Level of Proficiency Attained (Circle One)			
(c) Perform visual inspection of completed reconditioning on a section of road and determine whether or not work is acceptable; determine what part of work is not in compliance.		1	2	3	4
(13) <u>Inspect Metal Pipe, Item 603</u>					
(a) Determine that Contractor has copy of staked pipe list as soon as it is available.		1	2	3	4
(b) Determine that culvert staking is accurate and complete.		1	2	3	4
(c) Stake a culvert, including all necessary reference stakes.		1	2	3	4
(d) Inspect a culvert delivery for compliance with AASHTO T-147; receive manufacturer's certificate of compliance; measure thickness.		1	2	3	4
(e) Inspect installation of a culvert, including any special features.		1	2	3	4
(f) Perform compaction (relative density) test on culvert bed and backfill.		1	2	3	4
(14) <u>Contract Administration</u>		1	2	3	4
(a) If warning is ignored, issue at least one notice of noncompliance to Contractor's representative, including followup note when noncompliance has been remedied.		1	2	3	4

Figure 9-2. (cont.)--Performance validation worksheet.

Individual Performance Items	Date Performed (Initials/Comments)	Level of Proficiency Attained (Circle One)			
(b) Complete daily diary for every day on project.	_____	1	2	3	4
(c) Prepare at least one progress payment (or Purchaser credit report) for Engineer's signature.	_____	1	2	3	4
(1) Measure work accomplishment for Items 201, 203, 204, 306, and 603 according to Section 106, 1979 specifications.	_____	1	2	3	4
(d) Transmit copy of compliance test results to Contractor's representative.	_____	1	2	3	4
(e) Make recommendation to COR/ER for design change on the contract.	_____	1	2	3	4
(f) Perform pre-final inspection to ensure that all work items are substantially completed prior to final inspection; submit punch list of remaining items to COR/ER.	_____	1	2	3	4
(g) Attend final inspection.	_____	1	2	3	4
(h) Prepare as-built drawings for a section of road which has been completed.	_____	1	2	3	4
(i) Prepare a final construction report per FSH 7709.11, Chapter 30.	_____	1	2	3	4

Figure 9-2. (cont.)--Performance validation worksheet.

Individual Performance Items	Date Performed (Initials/Comments)	Level of Proficiency Attained (Circle One)
(j) After project is completed and contract closed, consolidate Inspector's records and give to Engineer.	_____	1 2 3 4
<p>I certify that _____ (trainee) has completed the Individual Performance Items to the level of proficiency shown above:</p> <p>_____ Work Supervisor _____ Date</p> <p>_____ Trainee _____ Date</p>		

Figure 9-2. (cont.)--Performance validation worksheet.

PERIODIC CRITIQUE RECORD			
Comments:	Date:	Comments:	Date:
Trainee's Signature	Work Supervisor's Signature	Trainee's Signature	Work Supervisor's Signature
Comments:	Date:	Comments:	Date:
Trainee's Signature	Work Supervisor's Signature	Trainee's Signature	Work Supervisor's Signature
Comments:	Date:	Comments:	Date:
Trainee's Signature	Work Supervisor's Signature	Trainee's Signature	Work Supervisor's Signature
Comments:	Date:	Comments:	Date:
Trainee's Signature	Work Supervisor's Signature	Trainee's Signature	Work Supervisor's Signature

Figure 9-3.--Periodic critique record.



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